REMARKS

Responsive to the Office Action mailed December 31, 2007, Applicants amend claims 1, 5, 7, and 9 to recite the invention with greater clarity. Claim 10 is canceled. Upon entry of this Amendment, claims 1-3 and 5-9, and 11-18 are pending and under consideration.

Claim Amendment:

Claim 1 has been amended to include a limitation of a single fluorescence detector disposed in a predetermined direction for receiving and detecting the emitted light at the two or more wavelengths passing a tunable filter in the predetermined direction. The similar limitation is also included in claim 5, 7, and 9. Support for the amendment can be found throughout the specification and the drawings as filed. For example, in the Specification at page 2, lines 5-7 it is stated that the present invention relates more particularly to a multicolor particle analyzer and method which employs a single detector. At page 2, lines 29-30, it is stated that it is a further object of the present invention to provide a multicolor particle detection system and method, which employs a single detector. Additional support for the amendment can be found in the specification on page 3, lines 1-5, and 13-15. FIG. 1 also clearly illustrates a single detector 24 disposed in a predetermined direction for receiving and detecting emitted light at two or more distinctive wavelengths passing through a tunable filter in the direction.

Therefore, no new matter has been introduced by the above amendments.

Claim Rejections under 35 U.S.C. § 102:

Claim 9 stands rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by U.S. Patent Application Publication No. 2003/0017076 (Kochy *et al.*). Applicants traverse.

As an initial matter, the instant invention provides a simple, relative inexpensive multicolor particle detection system and method which employs a capillary tube, a

tunable filter, and a single fluorescence detector. The capillary tube provides a detection volume through which particles to be analyzed pass. The particles naturally fluoresce or are tagged with molecules to fluoresce at distinct wavelengths when they are illuminated in the detection volume by a light beam. The tunable filter is adapted to sequentially shift pass band between two or more wavelengths two or more times, or multiple times during the transit of each particle through the detection volume, thereby passing emitted light at two or more wavelengths in a predetermined direction. A single fluorescence detector is disposed in the predetermined direction to receive and detect the emitted light. Because the tunable filter sequentially and repetitively shifts pass band during the transit of each particle through the detection volume, particles that emit at two or more distinct wavelengths, i.e., in a multicolor system, can be detected, and each particle can be detected multiple times using a single fluorescence detector. A sampled output signal pulse is thus measured at each fluorescent wavelength as each particle passes the illumination source. Only a single fluorescence detector is needed for a multicolor system detection as the tunable filter is adapted to sequentially shift pass band during detection. Further, the peak intensity and area of the output pulse for each particle can be determined from the signal pulse. This is in contrast to prior art systems which employ filters that are not tunable during detection but pass light at fixed wavelengths. These prior art systems all generate sampled output pulses using a multiplicity of fluorescence detectors.

Claim 9, as amended, calls for, among other limitations, repetitively passing the emitted light at each characteristic wavelength through a tunable filter in a predetermined direction during the transit of each particle through the illumination source, and repetitively detecting the emitted characteristic fluorescence of each of the particles multiple times using a single fluorescence detector disposed in the predetermined direction.

Kochy et al. do not teach or suggest repetitively detecting the emitted characteristic fluorescence of each of the particles multiple times using a single fluorescence detector disposed in the predetermined direction. In paragraph 0023 which is referred to by the Office Action, Kochy et al. teach two filters each placed in

front of one of detectors 23 and 24 to pass light at a specific wavelength, e.g., one filter passing light at wavelength 580 nm and the other at 675 nm. These filters are not tunable during detection but pass light at fixed wavelengths. Kochy et al. teach use of multiple fluorescence detectors 23 and 24 each for detecting light at a specific wavelength in a different direction. Kochy et al. do not teach the concept of single fluorescence detector multicolor particle analyzer system and method. In contrast, the instant application describes apparatuses and methods using a single filter and single detector to detect a number, two or more, of wavelengths. An instrument embodying the instant claims could be reconfigured to detect any number of different wavelengths, using a single detector, simply be changing the electrical control of the tunable filter. Following the teaching of Kochy et al., it would require replacement of the fixed-wavelength filter with another fixed wavelength filter if the center wavelength were to be changed. If it was desirable to detect an additional color, then Kochy et al would require an additional filter and detector, whereas the instant claims requires no additional hardware. This situation becomes still more complex if more than one additional color or change in color was desirable.

Based on the foregoing, Applicants respectfully request reconsideration of the rejections of claim 9 under 35 U.S.C. 102 over Kochy *et al.*

Claim Rejections under 35 U.S.C. § 103:

Claims 1, 3, and 11-13 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kochy *et al.* in view of U.S. Patent No. 5,567,294 ("Dovichi *et al.*"). According to the Office Action, Kochy *et al.* teach all the limitations recited in claim 1 except for a tunable filter. However, the Action indicates that Dovichi *et al.* teach a tunable filter. Therefore, the Action concludes that it would have been obvious for one of ordinary skill in the art to modify *Kochy et al.* in view of Dovichi *et al.* in order to pass selective light pulses corresponding to wavelengths of each particle resulting in clear and precise detected images of the particles which are displayed on a monitor for further evaluation. In particular, the Action indicates that paragraph 0023 of Kochy et al. teach filter placed in front of detectors 23 and 24 (page 3 of the Action), "which constitute adapted to sequentially shift pass band between two or more wavelengths

multiple times as each particle passes through the illuminated detection volume." Applicants traverse.

Claim 1 as amended, calls for a single detector multicolor particle analyzer including a tunable filter adapted to sequentially shift pass band between two or more wavelengths multiple times as each particle passes through the illuminated predetermined volume, thereby passing emitted light at the two or more wavelengths in a predetermined direction, and a single fluorescence detector disposed in the predetermine direction for receiving and detecting the emitted light.

Kochy et al. do not teach or suggest a tunable filter adapted to sequentially shift pass band between two or more wavelengths multiple times as each particle passes through the illuminated detection volume, thereby when in operation the tunable filter sequentially passes emitted light at the two or more wavelengths in a predetermined direction. Nor do Kochy et al. teach or suggest a single fluorescence detector disposed in the predetermined direction for receiving and detecting the emitted light at the two or more wavelengths from the tunable filter. Kochy et al. teach multiple filters each for passing light at a fixed wavelength in a different direction. Kochy et al's filters do not *sequentially* shift pass band between two or more wavelengths *multiple times* as each particle passes through the illuminated detection volume. Kochy et al. teach multiple fluorescence detectors 23 and 24 for receiving and detecting emitted light passing though the multiple filters in different directions.

Nor do Dovichi *et al.* teach or suggest a tunable filter adapted to *sequentially shift* pass band between two or more wavelengths multiple times *as each particle passes through the illuminated predetermined volume*, as called for by instant Claim 1. In addition, Dovichi *et al.* do not teach measuring a sampled signal output at each fluorescent wavelength using a single fluorescence detector in combination with a tunable filter.

At Col. 5, lines 44-46 which is relied upon by the Office Action, Dovichi *et al.* teach that the filter may be a set of filters on a rotating wheel, or can be a grating or a prism. The filters on a rotating wheel or a grating or prism cannot shift pass band during

detection, or as each particle passes through the illuminated predetermined volume. Although Dovichi *et al.* teach that their filter can be a tunable filter, Dovichi *et al.*'s tunable filter do not sequentially shift pass band during detection, *i.e.,* when particles pass through the illuminated volume. The pass band of Dovichi *et al.*'s filter is fixed during detection of the particles. Dovichi *et al.* teach an analyzer for a single color system. There is no teaching throughout Dovichi *et al.* on sequentially shifting pass band during detection of each particle. Nor is there any teaching in Dovichi *et al.* on pass band shifting multiple times from each wavelength during the transit of each particle passing through the illumination volume. It is respectfully submitted that neither Kochy *et al.* nor Dovichi *et al.* teach or suggest the concept of shifting pass band sequentially, and repetitively a number of times as each particle passing through an illumination volume, and using a single fluorescence detector to receive and detect emitted light passing through the tunable filter.

Accordingly, even if one of ordinary skill would arguably attempt to combine Kochy et al. with Dovichi et al., the combination would arrive at the invention recited in claims 1, 3, and 11-13.

Based on the foregoing, Applicants respectfully request reconsideration of the rejections of claims 1, 3, and 11-13 under 35 U.S.C. 103(a) over Kochy *et al.* in view of Dovichi *et al.*

Claims 5-8, 10, and 14-18 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kochy *et al.* in view of U.S. Patent No. 6,210,973 ("Pettit"). According to the Office Action, Pettit teaches an acousto-optic tunable filter, relying on Col. 8, lines 13-18. Therefore, the Examiner concludes that it would have been obvious for one of ordinary skill in the art to modify *Kochy et al.* in view of Pettit in order to allow the passing of desired pulses of fluorescence wavelength which are detected and converted into electrical signals wherein pulse output result in clear and precise images displayed on a monitor for further analysis. Applicants traverse.

Claim 5, as amended, calls for, among other limitations, the use of a tunable filter for receiving emitted light and a single fluorescence detector for detecting emitted light

passing the tunable filter. The tunable filter is adapted to sequentially shift pass band between two or more wavelengths multiple times as each particle passes through the analyzing region, whereby sequentially passing emitted light at the two or more wavelengths in a predetermined direction. The single fluorescence detector is disposed in the predetermined direction to detect the emitted light at the two or more wavelengths to provide emitted signals representative of the distinct wavelengths.

Likewise, claim 7 calls for the limitations of a tunable optical filter adapted to sequentially shift pass band between two or more wavelengths multiple times as each particle passes through the illuminated analyzing volume to provide emitted light at the two or more wavelengths in a predetermined direction, and a single fluorescence detector disposed in the predetermined direction for receiving and detecting the emitted light at the two or more wavelengths.

Like Dovichi *et al.,* Pettit does not teach or suggest a tunable filter adapted to sequentially shift pass band between two or more wavelengths multiple times as each particle passes through the illuminated predetermined volume. Nor does Pettit teach or suggest a single fluorescence detector disposed in the predetermined direction for receiving and detecting emitted light passing the tunable filter.

Based on the foregoing reasons, Applicants respectfully request reconsideration of the rejections of claims 5 and 7, and dependent claims 6, 8, 10, and 14-18 under 35 U.S.C. 103(a) over Kochy *et al*. in view of Pettit.

Applicants respectfully submit that the instant application is in condition for allowance. An early indication of the same is therefore respectfully requested. If any matters can be resolved by telephone, the Examiner is invited to call the undersigned attorney at the telephone number listed below. No fees beyond those being submitted concurrently herewith are believed due. However, the commissioner is authorized to charge any additional required fees, or credit any overpayment, to HOUST CONSULTING Deposit Account No. 50-4566.

Respectfully submitted,

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